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Zoogeographic Affinities of Prosobranch Gastropods of Offshore Coral Reefs in Northwestern Australia

by

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Abstract. One hundred seventy-two species of 20 families of prosobranch gastropods are recorded from offshore reefs in northern Western Australia. Of these, 58 species are known only from the offshore reefs and have not been collected along the mainland coast of the state. This parallels the Queensland situation where the fauna of the Great Barrier Reef is also different from the mainland fauna and suggests that there is no need to separate offshore areas into separate provinces.

At least 91% of the 172 species also occur in Queensland, strengthening the contention that the shallow-water inshore areas of Queensland should be considered, along with the northern coast of Western Australia, as part of a single Tropical Australian Province.

INTRODUCTION

THE SHALLOW-WATER MARINE FAUNA of Western Australia can be divided into three regions: a tropical north coast that runs northeast from North West Cape; a south coast east of Cape Leeuwin with a temperate fauna that is continuous with the remainder of southern Australia; and a west-coast-overlap zone between Cape Leeuwin and North West Cape where the tropical and temperate faunas are mixed in varying proportions. About 10% or less of the mollusks occurring in Western Australia are endemic to the state; most have at least part of their distributions in the west-coast-overlap area (WILSON & GILLETT, 1971; WILSON & STEVENSON, 1977; WELLS, 1980).

The fauna of the north coast of Western Australia is almost entirely tropical. Of 327 species of prosobranch gastropods recorded north of North West Cape by WELLS (1980) only three were classified as temperate species and 16 as endemic to Western Australia. No major faunal limits are found on the north coast; instead, species gradually drop out as latitude increases. North West Cape, at the northern extreme of the west-coast-overlap zone is the major southern limit for tropical species; of the 230 species that reach North West Cape, 90 have their southernmost known distribution in the area (WELLS, 1980). For mollusks the north coast of Western Australia is thus best considered as a single zoogeographic area.

The question of how the fauna of northwestern Australia relates to that of the remainder of northern Australia has been more controversial. HEDLEY (1926) divided tropical Australia into a Solanderian province east of Cape York and a Dampierian province extending from the Houtman Abrolhos-Geraldton area of Western Australia to Cape York. This was subsequently modified by WHITLEY (1932), who subdivided the Queensland shallow-water fauna into a Banksian province along the coast and the Solanderian fauna on the offshore Great Barrier Reef. The division of Australia's tropical coast into two provinces was followed by CLARK (1946), based on an analysis of echinoderm distributions, a division agreed to by MARSH (1976). However, ENDEAN (1957), also based on an echinoderm study, suggested that the Banksian (inshore) area of Queensland should be included with the Dampierian area in a single Tropical Australian Province. ENDEAN (1957) considered that the echinoderm fauna of the Great Barrier Reef was distinct from that of the mainland Queensland coast. Working on mollusks, WILSON & STEVENSON (1977) and WELLS (1980) considered that there were insufficient grounds for separating the Dampierian fauna of northwestern Australia from the eastern Australian fauna.

The above analyses for Western Australia have been based largely on specimens collected along the mainland coast; very little material has been available from offshore areas until recently. The offshore mollusks available con-

sisted primarily of a series of records of beach material collected at Browse Island by D. C. Laurenson in 1971. In 1978 Dr. B. R. Wilson visited Ashmore Reef and Seringapatam Reef on the Russian research vessel *Bogorov* for a one-week period and recorded 42 species of mollusks (Wilson, 1985). In 1982 a Western Australian Museum party collected intensively at Rowley Shoals and a second expedition went to Scott Reef and Seringapatam in 1984. These visits to offshore areas, though limited, resulted in significant new records of mollusks (and other marine organisms) from Western Australia. However, the mollusks collected range over the entire phylum and are beyond the taxonomic capabilities of any single individual to identify reliably. The analysis of distribution patterns of gastropods (Wells, 1980) was based on 20 prosobranch families best represented in the Western Australian Museum collections and best known taxonomically. The same 20 families are analyzed in the present paper, which has three objectives: to record in the literature new finds in Western Australia of these 20 families; to use the new information to help clarify zoogeographic relationships in northern Australia; and to draw the attention of other malacologists to the fact that there are additional new records for Western Australia in groups not discussed here.

THE OFFSHORE REEFS

Rowley Shoals, Scott Reef, and Seringapatam Reef (Figure 1) were considered by Fairbridge (1950) as the most perfect examples of shelf atolls in Australia. They are on the outer continental shelf 250 km or more from the nearest part of the continental mainland. Two areas of the continental shelf were described in the region by Carrigy & Fairbridge (1954): the Rowley Shelf, on which the Rowley Shoals are located, extends offshore from North West Cape to the Leveque Rise, which extends northwest from Cape Leveque, and the Sahul Shelf, on which Scott Reef and Seringapatam Atoll are located, from the Leveque Rise to the Londonderry Rise off the Northern Territory. The atolls rise almost vertically to the surface from depths of up to 500 m. The continental shelf is deep in this area and there is evidence of recent subsidence (Carrigy & Fairbridge, 1954), with the atolls being formed by rapidly growing columns of coral; there is no evidence of a volcanic origin (Fairbridge, 1950).

There are three reefs at Rowley Shoals (Mermaid Reef, Clerke Reef, and Imperieuse Reef) separated by 30–40 km of ocean. The reefs are 16–18 km long on the north-south axis and are pear shaped with the southern end being larger. The maximum width is 8–10 km. Scott Reef is a double reef with a circular reef 16 km in diameter in the north and a 27-km-wide horseshoe-shaped reef in the south. The two reefs are separated by a narrow channel with depths of up to 600 m. Seringapatam Reef is a small reef north of Scott Reef, with a maximum dimension of 10 km.

The reefs all have intertidal reef flats up to 2 km across enclosing large lagoons. One or more channels through the reefs are present, usually near the northeastern corners. The reef flats on the western sides, from where the prevailing swell comes, are broader than on the eastern sides. The reef flats are low and drop off quickly into the seaward slope. Spring tides at Rowley Shoals were estimated to have a range of 5 m. After the tide reaches to the level of the reef flat, water in the lagoon is trapped and can exit only through the channels. This results in water within the lagoon being trapped at a level up to 2 m higher than the surrounding ocean at low tide. Tides are semidiurnal. The lagoons are shallow, with sand bottoms and maximum depths of about 50 m. Isolated coral patches within the lagoons reach near to the surface at low tide. Unvegetated sand cays are present on some reefs but are absent on others.

MATERIALS AND METHODS

The Rowley Shoals Expedition was conducted in July 1982, with seven full days at the Shoals, six at Clerke Reef, and one at Mermaid Reef. The Scott Reef Expedition was undertaken in September 1984, with 10 days in the Scott Reef area, nine at Scott Reef and one at Seringapatam Reef. On both occasions the 18-m rock-lobster fishing vessel *Piscean* was chartered out of Broome for the trip. The trips were timed to coincide with a sequence of spring tides. Specimens were collected in as many ways as possible: snorkelling, scuba diving, limited dredging, intertidal collecting, and searching the strand line of the intertidal sand cays. The *Piscean* was moved about and anchored in different areas to provide access to as many habitats as possible, including the seaward slope of the reefs, reef crest, reef flat, lagoon areas, and intertidal sand cays. At Clerke Reef and Scott Reef, all of the above habitats were sampled. At Mermaid Reef and Seringapatam, only the reef flat was sampled.

Living specimens were preserved in 10% buffered formalin and later were transferred to 70% alcohol. Dead shells were retained in cloth bags. All specimens were sorted in the laboratory, labelled and identified. Specimens of all species from each reef were retained and catalogued and are in the collections of the Western Australian Museum.

Queensland occurrences of the species in Table 1 are largely derived from the published literature, in particular Wilson & Gillett (1979) and Robertson (1981). Other sources used were Abbott (1960, 1961), Burgess (1970), Cernohorsky (1976, 1984), Hinton (1980), and Zeigler & Porreca (1969). In some cases the collections of the Western Australian Museum have Queensland material for species not recorded in the literature from Queensland. When the literature search had been completed and the Western Australian Museum collections examined, the collections of the Australian Museum, Sydney, were searched for species still not recorded from Queensland.

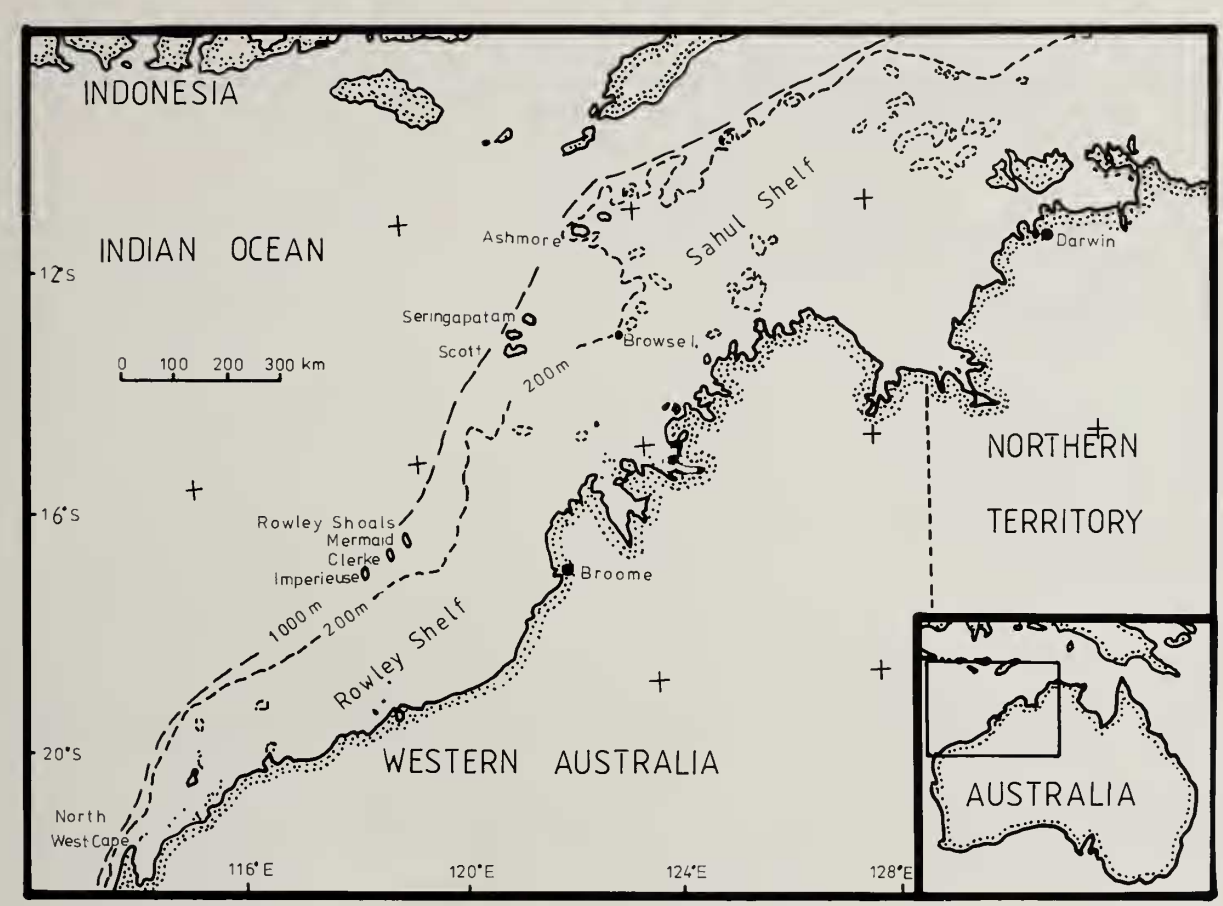

Figure 1

Map of northwestern Australia showing the locations of the offshore reefs.

RESULTS

The species of the 20 prosobranch families considered here that were collected on the Rowley Shoals and Scott Reef expeditions are listed in Table 1. Also listed are records for these species at the other offshore areas of Ashmore Reef and Browse Island and their occurrence in Queensland. A total of 172 species of the 20 families was collected, with about half of the total number of mollusk species recorded during the two trips. Of the 172 species, 58 (34%) have been recorded in Western Australia only on the offshore islands. One hundred and fifty-six (91%) are also known from Queensland. All are Indo-west Pacific species; none is restricted to Western Australia.

The trips were of too limited a duration to examine in detail differences between the fauna of the various reefs. Of the 172 species collected at Scott Reef and (or) Rowley Shoals, 74 were found at both. Many of the species recorded at only one of the two were recorded as single individuals or as only a few specimens. There were some clear differences in the molluscan faunas of Scott Reef and Rowley Shoals. *Strombus luhuanus,* for example, was common on an intertidal sandflat at Scott Reef and *Conus quercinus* was abundant on reef platforms; neither was collected at Rowley Shoals. Two colonies of *Cassis cornuta* were found at Scott Reef, but only a single individual has been found at Rowley Shoals (G. Sartori, personal communication). *Hebra horrida* and *Nassarius papillosus* were common at Rowley Shoals but were not recorded at Scott Reef. These records indicate that there are some differences in the fauna that are natural reflections of available habitats.

A second, and more easily visible, source of faunal difference is human predation. Several species of giant clams were recorded at Rowley Shoals: *Tridacna gigas* (Linnaeus, 1758), *T. crocea* Lamarck, 1819, *T. squamosa* Lamarck, 1819, *T. maxima* (Röding, 1798), and *Hippopus hippopus* (Linnaeus, 1758). *Tridacna maxima* was recorded as a juvenile individual. *Tridacna gigas,* while not common, was seen at a number of localities and at least 15 individuals were observed, including several on the reef

Table 1

Species of 20 families of prosobranch gastropods recorded from coral reef areas off the northwestern Australian coast.

Species	Known in W.A. only from offshore reefs	Reef area					
		Rowley Shoals	Scott	Seringa-patam	Ashmore	Browse	Queens-land
Family Haliotidae							
Haliotis asinina Linnaeus, 1758		x			x		x
Haliotis ovina Gmelin, 1791		x	x	x			x
Haliotis cf. *H. planata* (Sowerby, 1833)	x	x					—
Family Trochidae							
Angaria delphinus (Linnaeus, 1758)			x	x			x
Clanculus atropurpureus (Gould, 1849)		x					x
Tectus fenestratus (Gmelin, 1791)					x		x
Tectus pyramis (Born, 1778)		x	x	x	x	x	x
Tectus cf. *T. triserialis* Lamarck, 1822	x	x					x
Trochus hanleyanus Reeve, 1843		x					x
Trochus histrio Reeve, 1842	x	x			x		x
Trochus maculatus Linnaeus, 1758		x	x	x	x		x
Family Turbinidae							
Astraea rhodostoma (Lamarck, 1822)	x	x					x
Turbo argyrostomus Linnaeus, 1758		x	x	x			x
Turbo chrysostomus Linnaeus, 1758	x	x	x	x	x	x	x
Turbo petholatus Linnaeus, 1758			x				x
Turbo cf. *T. radiatus* Gmelin, 1790	x	x					x
Family Neritidae							
Nerita albicilla Linnaeus, 1758		x	x	x			x
Nerita plicata Linnaeus, 1758		x	x	x			x
Nerita polita Linnaeus, 1758		x	x	x			x
Family Littorinidae							
Littorina undulata Gray, 1839		x	x	x			x
Family Strombidae							
Lambis chiragra (Linnaeus, 1758)		x	x	x			x
Lambis lambis (Linnaeus, 1758)			x	x	x		x
Lambis truncata (Humphrey, 1786)	x	x	x				x
Strombus dentatus Linnaeus, 1758	x		x				—
Strombus gibberulus Linnaeus, 1758		x	x		x		x
Strombus latissimus Linnaeus, 1758	x		x				x
Strombus lentiginosus Linnaeus, 1758	x	x	x	x			x
Strombus luhuanus Linnaeus, 1758	x	x	x			x	x
Strombus mutabilis Swainson, 1821		x	x		x		x
Strombus pipus Röding, 1798	x				x		x
Family Naticidae							
Natica bougei Sowerby, 1908	x		x				x
Natica gualtieriana (Récluz, 1844)		x	x				x
Natica robillardi Sowerby, 1893	x	x					x
Polinices melanostomus (Gmelin, 1791)		x	x		x		x
Polinices powisiana (Récluz, 1844)				x			x
Polinices pyriformis (Récluz, 1844)		x	x	x			x
Family Cypraeidae							
Cypraea annulus Linnaeus, 1758			x	x	x		x
Cypraea arabica Linnaeus, 1758			x	x	x		x
Cypraea asellus Linnaeus, 1758		x		x			x
Cypraea caputserpentis Linnaeus, 1758		x	x	x	x	x	x
Cypraea carneola Linnaeus, 1758		x	x		x	x	x
Cypraea chinensis Gmelin, 1791			x		x		x
Cypraea depressa Gray, 1824	x	x	x	x			—

Table 1

Continued.

Species	Known in W.A. only from offshore reefs	Reef area					Queens-land
		Rowley Shoals	Scott	Seringa-patam	Ashmore	Browse	
Cypraea erosa Linnaeus, 1758		x	x	x	x	x	x
Cypraea helvola Linnaeus, 1758		x			x		x
Cypraea hirundo Linnaeus, 1758		x	x				x
Cypraea histrio Linnaeus, 1758		x	x	x		x	x
Cypraea isabella Linnaeus, 1758		x	x	x	x		x
Cypraea kieneri Hidalgo, 1906			x				x
Cypraea labrolineata Gaskoin, 1848			x		x	x	x
Cypraea lynx Linnaeus, 1758		x	x		x	x	x
Cypraea moneta Linnaeus, 1758		x	x	x	x	x	x
Cypraea nucleus Linnaeus, 1758		x				x	x
Cypraea poraria Linnaeus, 1758		x					x
Cypraea staphylaea Linnaeus, 1758			x			x	x
Cypraea talpa Linnaeus, 1758			x				x
Cyraea testudinaria Linnaeus, 1758	x			x		x	x
Cypraea tigris Linnaeus, 1758		x	x	x	x	x	x
Cypraea vitellus Linnaeus, 1758		x	x	x	x	x	x
Family Cassidae							
Casmaria erinaceus (Linnaeus, 1758)		x	x	x	x		x
Cassis cornuta (Linnaeus, 1758)			x				x
Cypraecassis rufa (Linnaeus, 1758)	x		x				x
Family Tonnidae							
Malea pomum (Linnaeus, 1758)			x				x
Tonna perdix (Linnaeus, 1758)		x	x				x
Family Muricidae							
Chicoreus brunneus (Link, 1807)			x				x
Family Thaididae							
Drupa grossularia (Röding, 1798)			x	x			x
Drupa morum (Röding, 1798)			x	x			x
Drupa ricinus (Linnaeus, 1758)		x	x				x
Drupa rubusidaeus Röding, 1798		x	x	x			x
Drupella cornus (Röding, 1798)		x	x	x			x
Maculotriton serriale (Deshayes, 1834)		x	x				x
Mancinella tuberosa (Röding, 1798)		x	x	x			x
Morula biconica Blainville, 1832	x	x	x	x			x
Morula fiscella (Gmelin, 1790)	x	x	x	x			x
Morula granulata (Duclos, 1832)		x	x	x			x
Morula nodicostata (Pease, 1868)		x	x	x			x
Morula spinosa (H. & A. Adams, 1853)		x	x	x			x
Morula uva (Röding, 1798)		x	x		x		x
Muricodrupa funiculus (Wood, 1828)		x					—
Nassa francolina (Bruguière, 1789)			x				—
Thais aculeata (Deshayes, 1844)			x				x
Thais armigera (Link, 1807)	x		x	x			x
Family Columbellidae							
Pyrene punctata (Bruguière, 1789)			x				x
Pyrene testudinaria (Link, 1807)		x					x
Pyrene turturina (Lamarck, 1822)			x				x
Pyrene varians (Sowerby, 1832)		x	x				x
Family Nassariidae							
Hebra horrida (Dunker, 1847)		x					x
Nassarius albescens (Dunker, 1846)		x	x	x			x
Nassarius gaudiosus (Hinds, 1844)		x	x				x

Table 1

Continued.

Species	Known in W.A. only from offshore reefs	Reef area					Queens-land
		Rowley Shoals	Scott	Seringa-patam	Ashmore	Browse	
Nassarius granifer (Kiener, 1834)	x	x					x
Nassarius papillosus (Linnaeus, 1758)	x	x					x
Family Fasciolariidae							
Fusinus undatus Gmelin, 1790			x				—
Latirus craticulatus (Linnaeus, 1758)	x	x	x		x		—
Latirus nodatus (Gmelin, 1790)	x	x	x				x
Latirus polygonus (Gmelin, 1790)		x					x
Latirus turritus (Gmelin, 1790)		x	x				x
Latirolagena smaragdula (Linnaeus, 1758)	x	x	x	x		x	x
Peristernia fastigatum (Reeve, 1847)	x	x					x
Peristernia nassatula (Lamarck, 1822)	x	x	x				x
Peristernia ustulatus (Reeve, 1847)			x				—
Pleuroploca filamentosa (Röding, 1798)		x	x	x	x		x
Family Olividae							
Oliva annulata (Gmelin, 1791)	x	x	x	x			x
Oliva caerulea (Röding, 1798)		x					x
Oliva cf. *O. panniculata* Duclos, 1835	x		x				—
Oliva tessellata Lamarck, 1811	x		x				x
Oliva textilina Lamarck, 1811	x		x				x
Family Mitridae							
Mitra chysalis Reeve, 1844				x			x
Mitra chrysostoma Broderip, 1836	x		x				x
Mitra cucumerina Lamarck, 1811	x		x				x
Mitra decurtata Reeve, 1844	x		x	x			—
Mitra imperialis Röding, 1798			x				
Mitra litterata Lamarck, 1811		x	x	x			x
Mitra mitra (Linnaeus, 1758)			x	x			x
Mitra paupercula (Linnaeus, 1758)	x	x	x	x			x
Mitra rubritincta Reeve, 1844	x		x				—
Mitra stictica (Link, 1807)			x				x
Neocancilla papilio (Link, 1807)	x	x	x				x
Pterygia dactylus (Linnaeus, 1767)	x			x			x
Pterygia nucea (Gmelin, 1791)	x		x				x
Family Costellariidae							
Vexillum cadaverosum Reeve, 1844			x				x
Vexillum consanguineum (Reeve, 1845)	x		x				x
Vexillum deshayesi Reeve, 1844			x				x
Vexillum exasperatum Gmelin, 1791	x		x				x
Vexillum granosum (Gmelin, 1790)	x		x				x
Vexillum cf. *V. rosea* Broderip, 1836			x				—
Vexillum sanguisugum Linnaeus, 1758	x		x				x
Vexillum semicostatum Anton, 1839	x		x				—
Vexillum speciosum (Reeve, 1844)			x				—
Vexillum cf. *V. turrigerum* (Reeve, 1845)	x	x	x				x
Vexillum zelotypum (Reeve, 1845)			x				—
Family Volutidae							
None							
Family Conidae							
Conus arenatus Hwass in Bruguière, 1792		x	x	x			x
Conus balteatus Sowerby, 1833	x	x					x
Conus capitaneus Linnaeus, 1758		x	x				x
Conus catus Hwass in Bruguière, 1792		x					x

Table 1

Continued.

Species	Known in W.A. only from offshore reefs	Reef area					
		Rowley Shoals	Scott	Seringa-patam	Ashmore	Browse	Queens-land
Conus ceylanensis Hwass in Bruguière, 1792			x			x	x
Conus chaldeus (Röding, 1798)		x	x	x			x
Conus coronatus Gmelin, 1791		x	x	x			x
Conus distans Hwass in Bruguière, 1792	x	x	x	x		x	x
Conus ebraeus Linnaeus, 1758		x	x	x	x		x
Conus eburneus Hwass in Bruguière, 1792		x	x	x			x
Conus flavidus Lamarck, 1810		x				x	x
Conus glans Hwass in Bruguière, 1792		x					x
Conus imperialis Linnaeus, 1758	x	x	x	x			x
Conus legatus Lamarck, 1810	x		x				x
Conus leopardus (Röding, 1798)	x	x	x				x
Conus litoglyptus Hwass in Bruguière, 1792	x		x				x
Conus litteratus Linnaeus, 1758	x		x			x	x
Conus lividus Hwass in Bruguière, 1792		x	x	x			x
Conus marmoreus Linnaeus, 1758		x	x				x
Conus miles Linnaeus, 1758		x	x				x
Conus miliaris Hwass in Bruguière, 1792			x				x
Conus mitratus Hwass in Bruguière, 1792	x		x				x
Conus musicus Hwass in Bruguière, 1792	x		x				x
Conus omaria Hwass in Bruguière, 1792		x					x
Conus pulicarius Hwass in Bruguière, 1792		x	x	x	x		x
Conus quercinus Solander, 1786	x		x				x
Conus rattus Hwass in Bruguière, 1792		x	x			x	x
Conus sponsalis Hwass in Bruguière, 1792		x	x	x			x
Conus striatus Linnaeus, 1758			x	x			x
Conus sugillatus Reeve, 1844			x	x			x
Conus tessulatus Born, 1780			x				x
Conus vexillum Gmelin, 1791			x				x
Conus vitulinus Hwass in Bruguière, 1792	x					x	x
Family TEREBRIDAE							
Hastula albula Menke, 1843	x		x				—
Terebra affinis Gray, 1834		x	x		x		x
Terebra areolata (Linnaeus, 1758)			x				x
Terebra crenulata (Linnaeus, 1758)		x	x				x
Terebra dimidiata (Linnaeus, 1758)		x					x
Terebra felina (Dillwyn, 1817)		x	x				x
Terebra guttata (Röding, 1798)	x		x				x
Terebra maculata (Linnaeus, 1758)		x	x				x
Terebra nebulosa (Sowerby, 1825)		x	x				x

flat. At Rowley Shoals giant clams were abundant on the reef flat, with *T. crocea, T. squamosa,* and *H. hippopus* being the most common. Indonesian fishermen are not permitted on Rowley Shoals and the area has been visited by Australian charter boats on a regular basis during only the last five years. In contrast Scott Reef is regularly visited by Indonesian fishermen who collect giant clams as a food source. Only three *T. gigas* were seen at Scott Reef, all by scuba diving in the lagoon. *Tridacna crocea,* a small species that is apparently not fished, is common on the reef flat, but other giant clams are not. Shells of *Trochus,* especially *T. niloticus* were also rare at Scott Reef compared to Rowley Shoals. These are also fished by the Indonesians.

Table 2 compares the numbers of mollusk species of the 20 prosobranch families recorded from the offshore reefs with records from the mainland coast of northern Western Australia. Data from the mainland coast are largely from WELLS (1980), modified somewhat by a few distributional records made since that paper was published. Of the 336 species of these families known from north Western Australia, only 115 (34%) are known from both the mainland coast and the offshore reefs. The inshore mainland fauna is twice as large as that known from

Table 2

Relationships of gastropod species from mainland localities and offshore reefs in northwestern Australia. Data for mainland species based on WELLS (1980).

	Mainland		Offshore reefs	
	No.	%	No.	%
Restricted to area	221	66	58	34
Known from mainland and offshore	115	34	114	66
Total	336	100	172	100

the offshore reefs. Clearly, additional collecting will increase the number of species known from offshore reefs, but the fauna is relatively restricted, and quite distinct from that farther inshore.

Not only is the offshore area distinct in terms of species composition but it differs in relative composition. Many of the species that have been reported both inshore and offshore have been found at only one or a few mainland localities but are abundant offshore. *Conus miles,* for example, has been recorded as isolated individuals at only five widely scattered localities along the entire mainland coast, but was common on reef platforms on Rowley Shoals and Scott Reef.

DISCUSSION

The collections from the offshore reefs of northern Western Australia have several interesting features. The fauna is limited by a lack of habitat diversity, although more species will no doubt be found as collecting proceeds. The fauna is typical of that of Indo-west Pacific offshore reef areas. Of the 172 species reported here, 102 were listed by MAES (1967) from the Cocos-Keeling Islands (Indian Ocean) and 84 from Chagos (Indian Ocean) by SHEPPARD (1984). Diversity in the 20 families examined is similar to that recorded for the two other Indian Ocean reef systems.

The series of offshore reefs extending from southern Indonesia to northern Australia provides a ready accessibility of the area for species with planktonic larval stages (MARSH, 1976; MARSH & MARSHALL, 1983), and families with this type of reproductive strategy are diverse on the offshore reefs. Volutes and muricids are common along the mainland shore, but only a single species was recorded from the offshore reefs. At least some species of both groups lack planktonic larval stages (WILSON & GILLETT, 1971; RADWIN & D'ATTILIO, 1976) and are thus prevented from reaching the offshore reefs.

At least 91% of the species recorded here also occur in Queensland; none is endemic to Western Australia. This strengthens the argument presented by ENDEAN (1957) and supported by WILSON & STEVENSON (1977) and WELLS (1980) that the waters of tropical Australia should be considered as a single Tropical Australian Province. However, ENDEAN (1957) considered the mainland echinoderm fauna of Queensland to be quite separate from that of the Great Barrier Reef, sufficiently so in fact to consider them as separate zoogeographic units. There has been no similar comparison of inshore and offshore mollusks in Queensland. The data presented here, even though preliminary, clearly show that there is a relatively small overlap of mainland and offshore mollusks in Western Australia, paralleling the situation described by ENDEAN (1957). However, the distinct nature of the mainland and offshore faunas is a result of habitat differences, not zoogeographical patterns, and there is no need to separate the mainland and offshore faunas of Western Australia into differing zoogeographical areas. This suggests that the Banksian province of Queensland should also be considered as part of the Tropical Australian Province, and not as a separate entity.

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